ANTHROPOLOGY.

ANTIQUITY OF MAN IN AMERICA.—The discoveries that are constantly being made in this country are proving that man existed on this continent as far back in geological time as on the European continent; and it even seems that America, really the old world geologically, will soon prove to be the birthplace of the earliest race of man. One of the late and important discoveries is that by Mr. E. L. Berthoud, which is given in full, with a map, in the Proceedings of the Philadelphia Academy of Sciences for 1872, p. 46. Mr. Berthoud there reports the discovery of ancient fireplaces, rude stone monuments, and implements of stone in great number and variety, in several places along Crow Creek in Colorado, and also on several other rivers in the vicinity. These fireplaces indicate several ancient sites of an unknown race differing entirely from the mound-builders and the present Indians, while the shells and other fossils found with the remains make it quite certain that the deposit in which the ancient sites are found is as old as the Pliocene and perhaps as the Miocene. As the fossil shells found with the relics of man are of estuary forms, and as the sites of the ancient towns are on extended points of land and at the base of the ridges or bluffs, Mr. Berthoud thinks the evidence is strongly in favor of the locations having been near some ancient fresh water lake, whose vestiges the present topography of the region favors.

MICROSCOPY.

FUNGOUS GROWTH IN SHELLS.—"In a paper read before the Manchester Philosophical Society on the 26th of February, Mr. Mark Stirrup exhibited sections of shells of mollusca, showing so-called fungoid growths. He referred to Dr. Carpenter's report on shell structure, presented to the meeting of the British Association in 1844, in which especial mention is made of a tubular structure in certain shells, Anomia being cited as a characteristic example. In the last edition of 'The Microscope,' Dr. Carpenter he said, withdraws his former explanation of this structure, and now refers it to the parasitic action of a fungus. Mr. Stirrup showed sections of this shell penetrated by tubuli from the outer

to the inner layers of the shell, and it is upon the inner layer that the curious appearances of sporangia, with slightly-branched filamentous processes proceeding from them, present themselves. The parasitic view is strengthened by the fact that these markings are not found in all parts of the shell, and are certainly accidental. Professor Kölliker maintains the fungoid nature of these tubuli in shells as well as in other hard tissues of animals, as fish scales, etc. Mr. Wedl, another investigator, considers the tubuli in *all* bivalves as produced by vegetable parasites, and that no other interpretation can be given. This view does not seem to be borne out by the section of another shell which was exhibited, *Arca navicula*, in which the tubuli are always present forming an integrant part; they are disposed in a straight and tolerably regular manner between the ridges of the shell; moreover, they have neither the irregularly branched structure nor the sporangia." — *Monthly Microscopical Journal.*

Advancing Definition of Objectives. — Tolles has lately made a $\frac{1}{18}$ immersion objective for the United States Army Medical Museum, with which Dr. Woodward has produced photographic prints (of Nobert's bands) that far excel any previous work of the same kind. The transparencies on glass are remarkably clear, and the paper prints give the lines in such a startling appearance of relief that it is difficult, even after feeling of the paper, to realize that the lines and the spaces between them are all printed on the same plane. This lens seems likely to replace the now famous $\frac{1}{16}$ as a standard of comparison, the first appeal and the last, for high-power lenses of great pretensions for oblique-light work. If any maker has made or can make, of which last there is no doubt, a lens that will define Nobert's lines better than this, he will confer a favor by presenting to the world proof of the fact. The following note from Dr. Woodward explains itself.

Resolution of Nobert's Band. — I desire to make public the fact that, since February, 1872, I have received for inspection from Mr. R. B. Tolles of Boston, several objectives ranging from $\frac{1}{10}$ to $\frac{1}{20}$ (maker's nomenclature) which resolved the nineteenth band of the Nobert's plate in my hands. Last month I received from Mr. Tolles an objective made to fill an order of long standing for the Army Medical Museum. The immersion front of this objective (marked $\frac{1}{19}$ by the maker) separates the lines of Nobert's

plate, *from the lowest to the highest band, more satisfactorily than any objective I have hitherto tried.* I must also give its performance on *Amphipleura pellucida* by lamp light the preference over any similar work I have done or witnessed. The price of this objective was one hundred and seventy-five dollars.

I send herewith some glass transparencies from negatives of the nineteenth band, taken by this lens, together with some paper prints of the several groups of the plate.—J. J. WOODWARD, *Washington, Sept. 3d.*

PHOTO-MECHANICAL PRINTING.—In the September number of the NATURALIST is an article under this caption, giving some of Dr. Woodward's ideas, and an editorial dissent from them. Now this difference of opinion relates to a point that ought to be settled by the judgment of microscopists, and I write this for the purpose of calling for their views of the question. I quote from the article: "Even the microscopist himself, being unable to represent all that he sees, is obliged to select what he conceives to be of importance, and thus represents his own theories rather than severe facts" (*Dr. Woodward*). The comment is ["If, however, his theories are correct, and his delineation skilful, this very power of selection and construction enables him to give a distinctness and completeness which is lacked by the photographic camera."]

Here are two almost opposite principles of illustration in question. Which should be the governing one? What is the object of the pictures? Obviously there are two; one for explanation of the observer's theories; the other, that other observers may in repeating the observation be guided by and recognize what the first one had seen, and this I consider the all-important object of "figures." If the observer draws only what he thinks important, he must almost invariably make a picture quite different from the one seen in the microscope — he has omitted what he deemed the unimportant parts — and the pupil trying to follow him finds the actual appearance so different that he does not recognize it as the same. No doubt many of the misunderstandings or differences of opinions among microscopists have originated from this very defect of published figures, which have been taken to be what they purported to be, representations of what was actually seen — "if his theories are correct;" but if his theories are wrong then his skilful delineation has only misled

his readers. But if the draughtsman publishes his figure as explicitly as his theory, not as the representation of the "severe fact," then he will be understood.

On the other hand, the camera represents exactly what may be seen by any other observer, *using the same appliances* (which should in all cases be described) and the student can draw his own conclusions from the picture as to the soundness of the theories advocated. But then it must be remembered that a photograph can represent only one view of an object, while the observer by changing the focus of his instrument obtains a new view at each movement of the screw. With the high power lenses now in use, these differing views are all important for correctly understanding almost any object. Therefore scarcely anything can be properly illustrated by one photograph. Many objects must require several. —C. S.

This inflexible limitation of the photographic view to one section or plane of the object, is evidently one of the points referred to in the criticism quoted above, which, without referring to photography as a means of proof of alleged observations, or of submitting observations to investigators for criticism or deduction, only suggested that for communicating well ascertained facts a skilful delineation may contain more information than any available number of photographic representations. A good drawing, as intimated by Dr. Beale, may often supply the place of a long and unread verbal description.

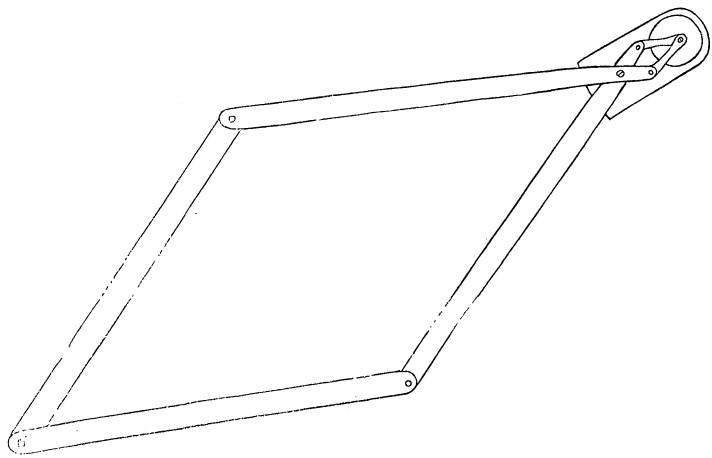
The Submersion Microscope. — Mr. Richards has presented to the Royal Microscopical Society an adjustable submersion tube which can be attached to any objective, thus avoiding the necessity of having a tube specially fitted to each objective which is to be used in this manner.

Dr. Dudgeon's paper in the "Quarterly Journal of Microscopical Science" for July, 1871, seems to claim originality for the idea of a submersion arrangement, but Mr. Richards and others have called it Mr. Stephenson's plan. We hope our London contemporaries will settle this question of priority, and give us the facts immediately. All the submersion arrangements are but slight variations of a single idea, and that for the present we credit to Dr. Dudgeon.

The Micro-pantograph. — Mr. Isaac Roberts publishes in the July number of the "Monthly Microscopical Journal" an illus-

trated description of a most important piece of apparatus. He undertakes to avoid the difficulties of the method of drawing by the camera lucida by substituting an instrument (Fig. 153) which shall present a fixed though large ratio between the movements of the pencil point on the paper and of a given point in the focus of the eye-lens of the ocular. A method previously in use and very easily used, for enlarging or reducing drawings is combined now, for the first time, with the microscope. Two parallelograms of light rods are constructed having their adjacent sides inflexibly connected with each other. All the intersections of the sides are pivoted so as to have a free horizontal motion, and the intersec-

Fig. 153.



tion of the two parallelograms is made a fixed point by screwing it to a brass plate which slides into the ocular in the usual position of a micrometer. The pivot at the outer end of the large parallelogram carries a pencil, and in the corresponding position in the small one is a glass plate with cross-lines ruled upon it. When in use in the microscope the cross-lines are in focus of the eye-lens, and the pencil rests upon a sheet of paper suitably supported near the top of the compound body. The pencil is to be so moved as to cause the intersection of the cross-lines to pass over the parts of the object desired to be delineated. Such a drawing would probably surpass in accuracy any other that could be made.

MOUNTING TISSUES IN BALSAM. — Portions of thin membranes, or of other tissues, especially when stained with carmine, silver or gold, may be transferred through alcohol to balsam by the following method described by Dr. J. J. Woodward. The preparations are examined in glycerine on a glass slide and under a thin glass cover, and they may be kept in this condition, without further preparation, for several weeks. When one is to be permanently preserved the cover is to be fastened down by a spring clip, and the whole arrangement immersed in seventy-five per cent. alcohol for a few days; after which it is transferred, for the same length of time, to absolute alcohol. The object may then be removed from its position under the cover, and it will be found sufficiently dehydrated to be mounted in balsam in the ordinary way. By this transfer to balsam, permanency is gained and corrugation and distortion are reduced to a minimum.

MOUNTING TISSUES IN DAMMAR VARNISH. — Dr. J. W. S. Arnold transfers sections of stained tissues from water to seventy-five per cent. alcohol. After soaking ten or fifteen minutes, the specimen is clarified by oil of cloves and immediately mounted in dammar varnish or balsam dissolved in chloroform. The distortion caused by absolute alcohol is avoided, and the objects are rendered sufficiently transparent.

LOGWOOD STAINING FLUID. — Hæmatoxylin is preferred to carmine as a means of staining tissues, by some microscopists. Dr. J. W. S. Arnold prepares the solution by rubbing together in a mortar one part of common logwood extract and three parts (by measure) of pulverized alum, and afterwards gradually adding enough water to dissolve only a part of the powder. The saturated solution thus formed should be of a dark violet color. If too red, more alum must be added. After standing several days it is to be filtered and diluted by one-fourth its bulk of seventy-five per cent. alcohol.

FUNGI IN DRINKING WATER. — Prof. James Law found fungi in the blood and in the milk of cows who drank water abounding in diatoms and spores. The health of the cattle was manifestly impaired. Only a part of the cows drinking the water were susceptible to its effect, and they recovered after a change of water and the use of bisulphate of soda. The organisms observed are figured in "The Lens."

STRUCTURE OF PODURA SCALES. — Dr. J. W. S. Arnold has succeeded in throwing off, by means of the electric induction spark, some of the "spines" of the familiar test scale of "Podura." Preparatory to this experiment the scales are rendered brittle by drying in an oven. The detached spines are easily beaded by unilateral light.

DRY ROT. — Thomas Taylor, of Washington, D. C., found microscopic fungi upon the leaves of a book which was gradually perishing by dry rot. After treatment by a strong solution of carbolic acid, no further injury occurred.

NOTES.

CAPTAIN Scammon announces the speedy publication by subscription of a new work on the "Cetaceans and other Marine Animals of California." The plates are to be full and finely executed. Professor Agassiz commends it as follows.

SAN FRANCISCO, October 1, 1872.

My Dear Sir: I have been delighted to look over the engravings of the cetaceans and other marine mammals of the West Coast of North America, to illustrate your work upon their natural history, because it is the first time I have seen the whale properly exhibited on paper.

Your practical knowledge of these animals, and the faithfulness of detail and excellence of the representations, will make the work standard; and it will give me the greatest pleasure to do everything in my power to obtain subscribers for you in the Atlantic States and in Europe.

With the deepest interest in your labors, believe me

Very sincerely yours, L. AGASSIZ.

To Capt. C. M. SCAMMON, *U. S. Revenue Marine, San Francisco, California.*

We are able to announce that the work will be published by the Naturalists' Agency, and that we are ready to receive subscriptions at this office and shall soon be able to give further information.

WE have to record the death, after a short illness, of Andreas S. Oersted, Professor of Botany in the University of Copenhagen, which occurred on September 3d. He was born on June 21st, 1816, and his earlier studies were directed to zoology; in 1841 he obtained the gold medal of the university for a thesis on the Danish Annelids. During the years 1846–48, Oersted travelled in Costa